Colorado Department of Public Health and Environment
Environmental Agriculture Program
CAFO Nutrient Management Plan (NMP)

I. GENERAL INFORMATION

Facility Name:	Dyecrest Dairy	**NPDES Permit Number:**	
Owner/Operator:	Terence Dye		
Facility Physical Address:	1137 North County Line Rd		
City:	Fort Collins	**State:** CO	**Zip Code:** 80524
Facility Phone:	(970) 484-9294	**Email/Cell No.:**	(970) 481-0286

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME AND OFFICL	Dyecrest Dairy, LLC Terence Dye 1137 North County Road 1 Fort Collins, CO 80524	*B. PHONE NUMBER* 970-484-9294
C. SIGNATURE		*D. DATE SIGNED* 12-20-2012

II. NUTRIENT MANAGEMENT PLAN INFORMATION[1]

NMP Public Notice Date: ____ **NMP Approval Date:** ____

NMP Implementation Date: ____ **NMP Revision Date[2]:** ____

Permit Expiration Date: ____

[1]The Environmental Ag Program can provide this information if not known.

[2]Note to CAFOs: To revise a NMP, the CAFO must provide the Ag Program the most current version of the NMP and identify changes from the previous version (preferably in track changes or otherwise highlighted and clearly identified). The Ag Program will review the revised NMP to ensure that it meets applicable requirements including effluent standards. If the NMP changes necessitate revision to the terms incorporated into the CAFO's permit, the Ag Program will determine if such changes are substantial as described in Colorado Water Quality Control Commission Regulation No. 61, Colorado Discharge Permit System Regulations, 5CCR 1002-61,(Regulation No. 61).

If the changes are deemed to be non-substantial, the Ag Program will revise the terms of the NMP that are already incorporated into the permit, notify the owner or operator, and inform the public of such changes (public notice not required). The revised NMP will then be added to the permit record.

If the changes to the terms of the NMP are deemed substantial, the Ag Program will provide public notice regarding the proposed changes on the CDPHE's website for a period of 10 business days. Information submitted by the CAFO in support of the NMP changes will be available for public review and comment upon request during this time. Once changes to the terms of the NMP are incorporated into the permit, the Ag Program will notify the CAFO and inform the public of the final decision concerning changes to the terms and conditions of the permit.

ASSOCIATED RECORDS: A current and approved version of the Nutrient Management Plan is kept on-site at the permitted facility at all times.

III. STORAGE OF MANURE AND PROCESS WASTEWATER

Adequate storage of manure and process wastewater is maintained, including the implementation of procedures to ensure proper operation and maintenance of the impoundments and tanks. [Regulation No. 61.17(8)(b)(iii)]

The following procedures are followed by the facility:

(A) Except during the designed storm event, manure and process wastewater stored in impoundments and terminal tanks is removed as necessary to maintain a minimum of two feet of freeboard or the Program-approved alternative freeboard level.

(B) Whenever the design capacity of impoundments and tanks is less than the volume required to store runoff from the designed storm event, the structures are dewatered to a level that restores the required capacity as soon as soils on a land application site have the water holding capacity to receive process wastewater.

Storage Needs

Manure volume generated annually by the facility: 13,072 tons

Process wastewater volume generated annually by the facility: 19,863,876 gallons

Process Wastewater Storage Information

Impoundment/ Tank/Drainage Basin ID	Total Capacity Required to Hold all Wastes Accumulated During the Storage Period (acre-feet)	Total Capacity Required to Contain Storm Event Runoff and Direct Precipitation (acre-feet)	Total Capacity Available (acre-feet)
Lagoon 1	20.97 acre feet	15.33 acre feet	17.5 acre feet
Lagoon 2			1.5 acre feet
Southwest Lagoon			17.3 acre feet
Compost Pond	8.2 acre feet	18.9 acre feet	27.1 acre feet

Manure Storage Information:

Manure Storage Area ID	Amount of Manure Produced (tons/year)	Total Amount of Non-Pen Area Manure Storage Available (estimated tons)
Manure Storage Area	13,072	423,831

Manure is transferred to a third party? ☒ Yes ☐ No

Manure is stockpiled in pen area? ☒ Yes ☐ No **Note: Manure may be stockpiled in and around pens and anyplace on the facility that drains to an impoundment.**

ASSOCIATED RECORDS:

The facility maintains the following records to ensure adequate storage of manure and process wastewater:

1) Records documenting the current design of all manure storage structures, including volume of solids accumulation, design treatment volume, total design volume, and approximate number of days of storage capacity.

2) Records documenting that manure and process wastewater stored in impoundments are removed (i.e. pumping records) as necessary to maintain a minimum of two feet of freeboard, or the Program-approved alternative freeboard level.

3) Weekly records of the depth of the manure and process wastewater in the liquid impoundment(s) and terminal storage tank as indicated by the required depth marker. Records include notation of the design storm pump-down level for each impoundment.

4) Daily records of inspections of water lines, including drinking water or cooling lines.

IV. ANIMAL MORTALITY MANAGEMENT

Animal mortalities (i.e., dead animals) are managed to prevent discharge of pollutants to surface water. Mortalities remain on the production area until disposal and are managed to ensure that they are not disposed of in a liquid manure, storm water, or process wastewater storage system that is not specifically designed to treat animal mortalities. [Regulation No. 61.17(8)(b)(iv)]

Method of Animal Mortalities Handling (check all that are applicable):

- ☐ Composting
- ☒ Rendering
- ☐ Burial
- ☐ Other: _____

Mortality Storage Area ID	Drainage	Impoundment/ Tank/Drainage Basin ID
Behind Old Milk Parlor	***Drains to***	Compost Pond
	Drains to	
	Drains to	
	Drains to	

ASSOCIATED RECORDS:

The facility maintains the following records to document proper management of mortalities:

1) Documentation demonstrating that animal mortalities are not disposed of in liquid manure, storm water, or process wastewater storage system that is not specifically designed to treat animal mortalities. Such records are maintained for a period of five years from the date created.

V. DIVERSION OF CLEAN WATER

Clean water is diverted, as appropriate, from the production area (i.e., from holding pens, manure and process wastewater storage systems, manure stockpiles, composting areas, etc.). [Regulation No. 61.17(8)(b)(v)]

Clean water is diverted from running onto the production area: ☒ Yes ☐ No

Clean water diversions used (check all that apply and indicate location where diversion is used):

		Location Used:
☒	Berms	Southwest
☒	Channels	East, North
☒	Natural Topography	South, West
☐	Other	_____

ASSOCIATED RECORDS:

The facility maintains the following records to document appropriate diversion of clean water from production area:

1) Results of weekly visual inspections of the production area and weekly inspections of all storm water run-on diversion devices and structures.

VI. PREVENTION OF DIRECT CONTACT OF ANIMALS WITH SURFACE WATER

Confined animals are prevented from having direct contact with surface water that is defined as waters of the United States. [Regulation No. 61.17(8)(b)(vi)]

Waters of the United States means, in part:

a) All waters… susceptible to use in interstate or foreign commerce…;

b) All interstate waters…;

c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands[1] (including wetlands adjacent to waters identified in (a) through (e) of this definition), sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

   1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

   2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

   3) Which are used or could be used for industrial purposes…;

d) All impoundments of waters otherwise defined as waters of the United States under this definition[2]; and

e) Tributaries of waters identified in paragraphs (a) through (d) of this definition.

---

[1] Wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

[2] Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the federal Clean Water Act (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the U.S. This exclusion applies only to manmade bodies of water which neither was originally created in waters of the U.S. (such as disposal area in wetlands) nor resulted from the impoundment of waters of the U.S.

1. Waters of the United States flow through the production area? ☐ Yes ☒ No

2. Animals have access to waters of the United States? ☐ Yes ☒ No

3. If yes, list the measures (e.g. fencing) used in the production area to prevent direct contact of animals with waters of the United States: _____

ASSOCIATED RECORDS:

The facility maintains the following records to document that animals are prevented from direct contact with waters of the United States:

1) Documentation demonstrating prevention of direct contact of confined animals with waters of the U.S.

2) Records are maintained for a period of five years from the date created.

VII. CHEMICAL AND OTHER CONTAMINANT HANDLING

Chemicals and other contaminants are properly handled on-site and are not disposed of in any manure, storm water, or process wastewater storage system unless specifically designed to treat such chemicals and other contaminants. [Regulation No. 61,17(8)(b)(vii)]

Chemical disposal location: Oil is picked up by manufacturer, other chemicals are not used

☒ Chemicals are used and empty containers are disposed of in accordance with manufacturer's guidelines

☐ No chemicals are used at the facility

☐ Other: _____

Chemicals storage location: shop

☒ Chemicals are not stored in a room with a floor drain that discharges outside (i.e., into the production area)

☒ Storage is covered

☐ Storage has secondary containment

☒ Chemicals are stored in proper containers

☐ Other: _____

ASSOCIATED RECORDS:

The facility maintains the following records to demonstrate proper handling of chemicals and other contaminants:

1) Documentation demonstrating that chemicals and other contaminants handled on-site are not disposed of in any manure, storm water, or process wastewater storage system unless specifically designed to treat such chemicals and other contaminants.
2) Records are maintained on-site for at least five years from the date created.

VIII. CONSERVATION PRACTICES

Site-specific conservation practices are identified and implemented to control runoff of pollutants to surface water. [Regulation No. 61.17(8)(b)(viii)]

Conservation practices include, but are not limited to the following:

- Solid manure is incorporated into the soils as soon as possible after application, unless the application site has perennial vegetation or is no-till cropped, or except where this nutrient management plan adequately demonstrates that surface water quality will be protected in areas where manure is not incorporated.
- Application of process wastewater to furrow- or flood-irrigated land application sites in a manner that prevents any process wastewater runoff into surface waters.
- When process wastewater is sprinkler-applied, the water holding capacity of the soil is not exceeded.
- Process wastewater is not applied to either frozen or flooded (i.e., saturated) land application sites.
- Manure or process wastewater is not applied within 150 feet of domestic water supply wells, or within 300 feet of community domestic water supply wells.

The facility implements the following best management practices to control runoff of pollutants to surface water. (check all that apply)

Conservation Practice	*Land Application Site ID Where Practice is Implemented
☒ Buffer	West and South
☒ Setback	NW
☐ Conservation Tillage	
☐ Constructed Wetland	
☐ Infiltration Field	
☐ Grass Filter	
☐ Terrace	
☐ Tail Water Pit	
☐ Process wastewater is not allowed to reach end of field	
☐ Other (describe):	
☐ Other (describe):	
☐ Other (describe):	

***For land application sites where surface water is located in or down-gradient of the site.**

ASSOCIATED RECORDS:

The facility maintains the following records to document site-specific conservation practices:

1) Documentation demonstrating that site-specific conservation practices have been identified and implemented to control runoff of pollutants to surface water.
2) Copies of Ag Program approvals for alternative setbacks, if used.
2) Records are maintained on-site for at least five years from the date created.

IX. SAMPLING & TESTING OF MANURE, PROCESS WASTEWATER AND SOIL

Manure is analyzed a minimum of once per year for nitrogen and phosphorous content, and a minimum of once every five years for soils for phosphorous content. The results are used to determine application rates for manure and process wastewater. The following protocols are used to ensure appropriate sampling and testing of manure, process wastewater and soil. [Regulation No. 61.17(8)(b)(ix)]

What is the frequency of manure, litter and process wastewater sampling? annually

Manure is transferred to a third party? ☒ Yes[1] ☐ No

Process wastewater is transferred to a third party? ☐ Yes[1] ☒ No

Frequency of soil sampling for nitrate: annually

Frequency of soil sampling for phosphorus: minimally every 5 years but typically every year

	Required Sampling Frequency	Required Analysis	Sampling Protocol	Testing Protocol
Manure	Annually[2]	Total Nitrogen Ammonia (as N) Nitrate (as N) Total Phosphorus	CSU Cooperative Extension (CSUCE) 568 A	☐ CSUCE ☒ Program-approved Method *(MDA certified lab)*
Process Wastewater	Annually[2]	Total Nitrogen Ammonia (as N) Nitrate (as N) Total Phosphorus	CSUCE 568 A	☒ USEPA Method ☐ Program-approved Method *(requested in writing)*
Soil Nitrate	Annually at a minimum[3]	Nitrate in necessary depth zone(s)	☐ CSUCE 568 A ☒ Other *Specify*: CSU 0.500[6]	☒ "Methods of Soil Analysis, Part 3, Chemical Methods" ☐ Program-approved Method *(requested in writing)*
Soil Phosphorus	Every five years at a minimum[4]	[5]Phosphorus in necessary depth zone(s)	☐ CSUCE 568 A ☒ Other *Specify*: CSU 0.500[6]	☒ "Methods of Soil Analysis, Part 3, Chemical Methods" ☐ Program-approved Method *(requested in writing)*

[1] Note to CAFOs: Prior to transferring manure or process wastewater to other persons, Large CAFOs must provide the recipient of the manure or process wastewater with the most current nutrient analysis. Large CAFOs must retain for five years records of the date, recipient name and address, and approximate amount of manure or process wastewater transferred to another person.

[2] Manure and process wastewater are sampled and tested for nitrate as often as necessary to meet the application rate calculation requirements.

[3] If analyses are conducted more frequently than annual, the analysis results are kept on-site for five years.

[4] Soils are sampled and tested for phosphorus a minimum of once every five years or as necessary to meet the transport risk assessment requirements.

[5] Appropriate soil sampling depths for phosphorus will vary by cropping system based on the description of the Soil Test Phosphorus Risk Factor 2 from the Colorado Phosphorus Index Risk Assessment.

[6] Soil will be routinely sampled to 2 feet

ASSOCIATED RECORDS:

The facility maintains the following records to document manure, process wastewater and soil testing:

1) A list of all protocols used for appropriate sampling and testing of manure, process wastewater and soil are maintained on-site for at least five years from the date created.

2) Results from sampling and testing of manure, process wastewater and soil are maintained on-site for at least five years from the date created.

X. LAND APPLICATION

Land application of manure or process wastewater is done in accordance with site-specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure or process wastewater. [Regulation No. 61.17(8)(b)(x) through (xii)]

Map(s) of land application sites are included in **Appendix A**.

Fields utilized for land application of manure and/or process wastewater are listed in Table B-1 in **Appendix B**.

Intended crops for each land application field are listed in Table B-2 in **Appendix B**. However, any crop listed might be planted, as determined by economics, field conditions at planting, and expected irrigation water availability.

Realistic yield goal calculations for each crop are included in **Appendix C**.

The methodology outlined in this section is adhered to each year in order to determine nutrient application rates, as a term of the permit. Nutrient applications and field nutrient balances are projected for the next five years, but these projections are for planning purposes only.

The basic application rates are determined in accordance with CSUCE Published Fertilizer Suggestions, or as otherwise listed in **Appendix D** and are based on the following:

- The amount of N and P in the manure that will be plant available is determined using one of the fertilizer suggestions for each crop.
- Nitrogen application rates (commercial fertilizer + plant available manure N) will not exceed crop N requirements (listed in Table 3), plus additional N needs, minus N credits:

	Gross N Recommendation
+	Extra N Needed
–	Past Year Legume N Credit
–	Past Year Manure N Credit
–	Soil Residual Nitrate
	Total N Application (Manure + Commercial Fertilizer)

- Nitrogen credits including past year legume credits, past year manure credits, and soil residual N to 2 feet (1 foot for grass and pasture, per CSU recommendations) will be determined in accordance with CSUCE Published Fertilizer Suggestions, or other sources as listed in **Appendix D**, for each crop.
- Nitrogen needs might include nitrogen to mineralize high residue from the previous crop, for grazing a grain crop, as a starter where no fertilizer is required, or to fertilize a second crop grown and harvested in the same crop year.
- Given the variable mineralization potential of manure and losses of soil nitrate, it is not uncommon to need to adjust nitrogen applications during the growing season. **Appendix D** outlines tools and methods that might be used.
- The outcome of field-specific assessment of potential for nitrogen and phosphorus transport to surface water for each field, using the USDA, NRCS Colorado Phosphorus Index Risk Assessment tool or other Division-approved method. The Colorado Phosphorus Index Risk Assessment is detailed in **Appendix E**.
- Application calculations are included in **Appendix F**, including projected manure and process wastewater applications and field nutrient balances for five years.

ASSOCIATED RECORDS:

The facility maintains the following records to document land application in accordance with site-specific nutrient management practices:

1) Documentation demonstrating that protocols established for land application of manure or process wastewater is conducted in accordance with site-specific nutrient management practices.
2) Calculation records demonstrating appropriate agricultural utilization of the nutrients in the manure or process wastewater.

XI. LAND APPLICATION EQUIPMENT INSPECTIONS

Manure and process wastewater is applied as uniformly as possible with properly calibrated equipment. [Regulation No. 61.17(8)(b)(x)(B)]

1) Nutrient application equipment is calibrated at least annually? ☒ Yes ☐ No
2) Method(s) of process wastewater application? Sprinkler and gravity
3) Method(s) of manure application? n/a
4) Nutrient application equipment is inspected within the six month period prior to the first application of manure or process wastewater? ☒ Yes ☐ No
5) Nutrient application equipment is inspected daily when wastewater is being applied? ☒ Yes ☐ No

ASSOCIATED RECORDS:

The facility maintains the following records to document equipment inspections:

1) Records documenting the date of periodic leak inspections of equipment used for land application of manure or process wastewater.

XII. SETBACK REQUIREMENTS

Manure and process wastewater is not applied closer than 100-feet to any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural wellheads or other conduits to surface water. [Regulation No. 61.17(8)(f)(iv)]

1) 100-foot setbacks are used between land application sites and any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural wellheads, or other conduits to surface waters?

   ☒ Yes ☐ No

2) A 35-foot vegetated buffer is used between land application sites and all down-gradient water of the U.S., open tile intake structures, sinkholes, agricultural wellheads, or other conduits to waters of the U.S. where applications of manure, litter, or process wastewater are prohibited within the buffer.

   ☒ Yes ☐ No

3) A setback alternative (approved by the Ag Program) is used to provide pollutant reductions equivalent or better than the reduction that would be achieved by the 100-foot setback?

   ☐ Yes (please describe) ☒ No (please explain)

   Please describe: n/a

   The following combination of setbacks, buffers and/or approved alternatives are used, as indicated below:

	Compliance Practice Implemented [(1), (2) or (3) above]:	**Land Application Site ID Where Practice is Implemented:**
Down-gradient Surface Waters	**I, II**	**West, South, NW**
Open Tile Line Intake Structure		
Sinkholes		
Agricultural Wellheads		
Other Conduits to Surface Waters		

ASSOCIATED RECORDS:

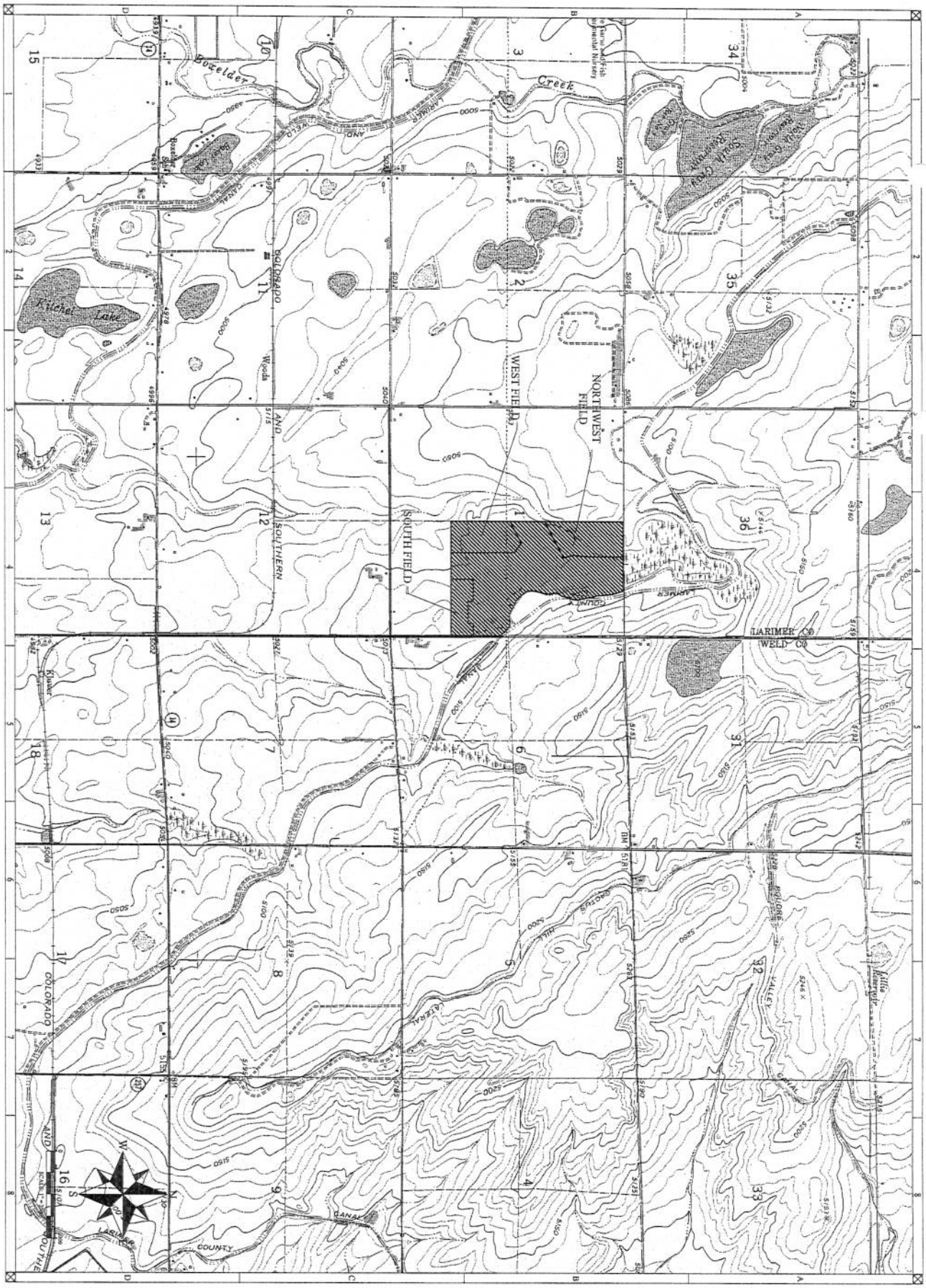
The facility maintains the following records to document setback requirements:

1) Records documenting setbacks used, and/or Ag Program approval of any setback alternatives.

APPENDIX A

NUTRIENT MANAGEMENT PLAN TERMS (1 – 6)

1) LAND APPLICATION FIELD MAPS



NMP

SHEET: 1 OF 1

DYECREST DAIRY NMP

DYECREST DAIRY
NMP - APPENDIX A

THE NORTHEAST 1/4 AND THE NORTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 1, TOWNSHIP 7 NORTH, RANGE 68 WEST, COUNTY OF LARIMER, STATE OF COLORADO

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE
4350 Highway 66, Longmont, CO 80504
(970) 535-9318 • fax: (970) 535-9854

APPENDIX B

NUTRIENT MANAGEMENT PLAN TERMS

2) LAND APPLICATION INFORMATION

NMP TERMS - 2) LAND APPLICATION FIELDS

All land application fields are listed below.

Table B-1 – Land Application Fields

Field Identification	Latitude[1]	Longitude[2]	Spreadable Acres[3]
West	40.602431	-104.952182	25
South	40.599845	-104.946222	11
NW	40.608505	-104.952440	25

[1]Enter latitude in decimal degrees.

[2]Enter longitude in decimal degrees [number should be negative (eg. -104.3315)].

[3]Field acreages reduced by any setbacks, buffers, or otherwise unspreadable areas.

NMP TERMS - 2) LAND APPLICATION CROPS

Potential crops or other uses for each land application field are listed below.

Table –B-2 – Potential Land Application Field Crops

Field Identification	Crop	Realistic Yield Goal	Yield Unit (bushels, tons, etc.)	Source (see Appendix C)
West, South	Alfalfa	3.7	Tons	County Stats
NW	Pasture/grass/hay	1.3	Tons	County Stats
All	Corn Grain	54.4	Bu	County Stats
All	Corn Silage	24.3	Tons	County Stats
All	Sorghum silage	5.6	Tons	County Stats, Calc
All	Sorghum grain	34	Bu	County Stats
All	Sorghum hay	1.7	Tons	County stats, Calc
All	Sudex silage	10	Tons	CSU FS
All	Sudex hay	1.7	Tons	CSU FS
All	Triticale silage	4.8	Tons	County Stats, Calc
All	Triticale hay	2.0	Tons	County Stats, Calc
All	Wheat silage	4.8	Tons	County Stats, Calc
All	Wheat hay	2.0	Tons	County Stats, Calc
All	Winter wheat grain	28.9	Bu	County Stats
All	Spring wheat grain	25.9	Bu	County Stats
All	Oat silage	6.05	Tons	County Stats, Calc
All	Oat hay	2.1	Tons	County Stats, Calc
All	Oat grain	36.3	Bu	County Stats
All	Sugar Beets	27	Tons	County Stats
All	Millet	35	Bu	State Stats
All	Sunflower	1465	Lbs	County Stats
All	Dry Beans	2198	Lbs	County Stats

DL = dryland, Irr = irrigated, dc = double cropped

APPENDIX C

NUTRIENT MANAGEMENT PLAN TERMS

3) EXPECTED CROP YIELD INFORMATION

Yield goals are based upon a variety of sources and are indicated in Table B-2:

Field: an average of the last 5 years of suitable data, plus10%. Years where yields were affected by drought, hail, insufficient nutrient availability or water, or other problems which would cause unnatural yield loss will not be included.

Farm: where a 5 year average does not exist but data from surrounding fields which are of similar productivity do exist, these yields will be included in the 5 year average. This is also the case where a whole farm yield is monitored rather than yields on individual fields. Where data on individual fields is kept but yield is similar across the farm, the data may be pooled together for simplicity.

Where a 5 year average has not been determined, one of several methods for determining yield goal, depending upon the availability of information, will be used.

- County or State Stats - Ag statistics for the county and crop – 5 years of data + 10%
- AGPRO - data from nearby farms, 5 years + 10%
- CES-FS - Cooperative Extension bulletin 568A or a production publication plus 10%

Calc: calculations will be used if a grain yield goal is known but not a forage yield goal for the same crop, based upon the following data:

Olsen Lab – "Guidelines for Fertilizer Recommendations, Plant Tissue Analysis, and Water Analysis"
Oat hay yield goal (t/a) x 17.5 = grain yield goal (bu/a)
Forage sorghum yield goal (t/a) x 20 = grain yield
Sorghum silage yield goal (t/a) x 6 = grain yield

Servi-Tech Lab (Crop File 1.02.022)
Corn silage yield goal (t/a) x 7.5 = grain yield, although this will vary with moisture and quality.
Small grain hay (t/a) x 14 = grain yield
Small grain silage (t/a) x 6 = grain yield

Triticale yields will be based upon potential wheat yield if Triticale yields are not known (KSU fact sheet MF-2227)

APPENDIX D

NUTRIENT MANAGEMENT PLAN TERMS

4) NUTRIENT BUDGET INFORMATION

Formulas are provided using recommendations from Cooperative Extension offices from Colorado and surrounding states. Recommendations from Olsen Lab, Servi-Tech Lab, and Midwest Lab may also be used, with the most current formulas provided in this NMP. Any one of these formulas or laboratories might be used to make a recommendation for a given crop in a single year, but two different formulas will not be used at the same time to make in season adjustments for the same crop. All of these laboratories are regionally based. They consider the recommendations from surrounding land grant universities as well as the most current research available. Colorado Cooperative Extension has found Midwest Lab's and ServiTech Lab's recommendations to be comparable to CSU's recommendations (From the Ground Up, Agronomy News, Cooperative Extension, CSU, Vol 24:1, April 2004). Olsen's Lab was not researched. Rather than hand calculating recommendations, the printed results on soil test results from the afore mentioned labs might also be used.

4) NUTRIENT BUDGET INFORMATION (yield goals are presented in Appendices B and C)

Cooperative Extension Nutrient Budget Information:

Crop:	Manure and Process Wastewater Application Rate Calculated Using:	Description of Method to be Used (calculation, look-up table, etc.):
Corn Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	35+(7.5*YG (tons/a) Tables 7A-8 CSU Bulletin #568A
Corn Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	35 + (1.2 * YG (bu/acre)) Tables 7b. CSU Bulletin #568A
Sorghum Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	9 * YG (tons/A) Tables 7d. CSU Bulletin #568A
Sorghum Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	1.2 * YG (lbs/A) Tables 7c. CSU Bulletin #568A
Triticale Hay & Silage	☐ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines X Department-approved Method	yield goal (lbs/a DM) * (% protein/6.25/100)/.66 multiply silage yield by 0.4 to get dry matter of silage N content/efficiency use factor Where protein is not known, 9% is used (KSU Bulletin MF-2227)
Oat Hay & Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (tons wet)*2000 lb/t*1.6% N/100 Multiply silage yield by 0.4 to get dry matter of silage Crop removal CSU 568A.
Spring Seeded Small Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	125 lbs N per 100 bu/A, minus 20 lb N/a for each 10 bu/A difference CSU Do-It-Yourself Manure Mgt Plan
Winter Wheat Grain	☐ CSUCE Published Fertilizer Suggestions X Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (bu/a) * 1.75 KSU Bulletin C-529 Wheat Production Handbook, 1997

4) NUTRIENT BUDGET INFORMATION

Cooperative Extension Nutrient Budget Information:

Crop:	Manure and Process Wastewater Application Rate Calculated Using:	Description of Method to be Used (calculation, look-up table, etc.):
Wheat Silage	☐ CSUCE Published Fertilizer Suggestions ☒ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	Convert yield to grain and fertilize as for grain KSU Bulletin MF-1072 Small Grain Cereals for Forage
Alfalfa	☒ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	((YG*2000)*(% Protein/6.25)*(soil factor))/0.66) Soil factor 0.5-0.7 for sandy to clay soil, respectively CSU Soil Publication #0.565 & 0.566
Sudangrass/ Sudex Hay	☐ CSUCE Published Fertilizer Suggestions ☒ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (tons/a DM) * 40 lbs N/ton KSU Bulletin MF-1036
Sunflowers	☒ CSUCE Published Fertilizer Suggestions ☒ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (lb/a) * 0.065 lbs N/lb grain High Plains Sunflower Production Handbook
Grass/hay	☒ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	185 lbs N/ton – 40 lbs N per ton for each ton yield goal less than a 4 ton yield goal (N credit to 1` soils sample) Reference is CSU 568A.
Small grain pasture and grain	☒ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	(animals/acre) x expected weight gain (lb/hd) x 0.4 = lbs N/a OR (Winter wheat recommendation plus 30-50 lbs N) Soil publication #0.565
Dry beans	☐ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☒ Department-approved Method	Non-irrigated Inoculated - 40 lbs N/acre Non-irrigated Non-inoculated - 70 lbs N/acre Irrigated crops Yield Goal (lbs/a) X .05 NDSU SF-720

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

Olsen Laboratories current formulas, lbs. N/yield unit (where not otherwise specified, multiply by yield goal as presented in Appendices B and C)

Corn silage – multiply silage yield goal by 7 and use grain recommendation

Corn grain – $\frac{(0.90)(\text{YG, bu/a})}{1-(0.0008)(\text{YG, bu/a})} + 50 = \text{lb N/bu}$

Sorghum/Sudex silage – multiply silage yield goal by 6 and use grain recommendation

Sorghum/Sudex hay – multiply hay yield goal by 20 and use grain recommendation

Sorghum grain - (YG)(1.2 N/bu) + 30 lb N

Triticale silage – 10 lb N/ton

Triticale hay –30 lb N/ton

Summer fallow wheat grain – 1.75 lbs N/bu

Continuous wheat grain – 2.0 lbs N/bu (includes nitrogen for stubble decomposition)

Spring wheat grain - (YG)(2.4 lbs N/bu) – (OM-1)*20

Wheat silage – 10 lb/ton

Wheat hay – 30 lb N/ton

Small grain grazing – 40 lbs N/a (not dependent on yield goal)

Oat silage – 9 lbs N/ton

Oat hay – multiply hay yield goal by 17.5 and use grain recommendation

Oat grain – 1.0 lb N/bu

Irrigated grass – 45 lbs N/ton

Dryland grass – 30 lbs N/ton

Sugar beets – (YG)(9 lbs N/ton) – 30*%OM – Residual N*1.67(2' soil sample)

Millet – 1.5 lb N/bu

Sunflower – 0.06 lb N/lb

Dry beans – (YG, bu)(2.0 lb N/bu) (+20 lbs N for kidney beans, -30 lbs N if inoculated, +30 lbs N on sandy soils)

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets:

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

ServiTech Laboratories current formulas, lbs. N/yield unit (multiply by yield goal as presented in Appendices B and C)

Corn silage - 10 lbs. N/Ton
Corn grain – 1.3 lb N/bu
Sorghum silage – 9 lb N/ton
Sorghum hay – 25 lb N/ton
Sorghum grain - 1.2 lb N/bu
Sudex silage – 7.5 lb N/ton
Sudex hay – 25 lb N/ton
Triticale silage – 10 lb N/ton
Wheat silage – 10 lb N/ton
Winter wheat grain – 1.75 lbs N/bu
Spring wheat grain -2.0 lbs N/bu
Small grain hay (triticale) – 26 lb N/ton
Oat silage – 12 lb N/ton
Oat hay – 25 lb N/ton
Oat grain – 1.0 lb N/bu
Pasture/Grass/Native grass – 40 lbs N/ton
Sugar beets – 7.5 lbs N/ton
Millet – 1.7 lb N/bu
Sunflower – 0.05 lb N/lb
Dry beans – 0.04 lb N/lb

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets:

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

ServiTech Laboratories current formulas, lbs. N/yield unit (multiply by yield goal as presented in Appendices B and C)

Corn silage - 10 lbs. N/Ton
Corn grain – 1.3 lb N/bu
Sorghum silage – 9 lb N/ton
Sorghum hay – 25 lb N/ton
Sorghum grain - 1.2 lb N/bu
Sudex silage – 7.5 lb N/ton
Sudex hay – 25 lb N/ton
Triticale silage – 10 lb N/ton
Wheat silage – 10 lb N/ton
Winter wheat grain – 1.75 lbs N/bu
Spring wheat grain -2.0 lbs N/bu
Small grain hay (triticale) – 26 lb N/ton
Oat silage – 12 lb N/ton
Oat hay – 25 lb N/ton
Oat grain – 1.0 lb N/bu
Pasture/Grass/Native grass – 40 lbs N/ton
Sugar beets – 7.5 lbs N/ton
Millet – 1.7 lb N/bu
Sunflower – 0.05 lb N/lb
Dry beans – 0.04 lb N/lb

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets:

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

Midwest Laboratories current formulas, lbs. N/yield unit (multiply by yield goal as presented in Appendices B and C)

Corn silage – 9.5 lbs. N/Ton
Corn grain – 1.3 lb N/bu
Sorghum silage – 7 lb N/ton
Sorghum grain - 1.3 lb N/bu
Sudex hay – 15 lb/ton
Triticale silage – convert yield to grain, use grain recommendation
Triticale grain – 1.5 lb N/bu
Winter wheat grain – 2.3 lbs N/bu
Wheat silage – convert yield to grain, use grain recommendation
Oat grain – 1.2 lb N/bu
Oat silage - convert yield to grain, use grain recommendation
Pasture/Grass/Native grass – 40 lbs N/ton
Sugar Beets – 8.5 lb N/ton
Millet – 1.6 lbs N/bu
Sunflower – 0.06 lbs N/lb
Dry beans – 0.4 lbs N/bu

Nitrogen Credits

Available Nitrogen in Wastewater (CSU Bulletin 568A, plus personal communication)
1st year N availability in wastewater, sprinkler applied (Organic N * 30%) + (NH_4-N * 55%)
1st year N availability in wastewater, flood applied (Organic N * 30%) + (NH_4-N * 78%)
2nd year N availability in wastewater (Organic N * 10%)

Available Nitrogen in Manure (minimum values)
1st year N availability in manure (Organic N * 25%) + (NH_4-N * % available below)
2nd year N availability in manure (Organic N * 10%)

Available Nitrogen in Compost (minimum values)
1st year N availability in manure (Organic N * 20%) + (NH_4-N * % available below)
2nd year N availability in manure (Organic N * 10%)

NH4-N % available, solid manure and slurry (UN NebGuide G1335).
Inject or immediate incorporation – 95%
Incorporate within 1 day – 50-70%
Incorporate 2-5 days – 0-50%
Incorporate >5 days – 0%

The laboratory's plant available nutrient schedule may also be used.

In the near future these mineralization factors may change, and this nutrient management plan will use the revised values from CSU. In fields which receive a similar amount of manure or wastewater each year, the 2 year mineralization rate may be added together and credited all in one year for simplicity.

Legume Credit- Previous crop, alfalfa

>80% stand	100-140 lbs N/A
60-80% stand	60-100 lbs N/A
<60% stand	30-60 lbs N/A

Alfalfa protein to be used in the absence of a forage test (CSU no. 0.565)

Maturity	% Crude Protein	% N
Pre-bud	22-24	3.5-3.8
Bud	20-22	3.2-3.5
Early bloom	17-19	2.7-3.0
Midbloom	14-16	2.2-2.6
Full bloom	<14	<2.2

Additional nitrogen needs

Crop decomposition

Up to 20 lbs/A additional nitrogen may need to be applied to carbonaceous crop residues.

Starter fertilizer

Regardless of the recommendations for nutrient application, up to 35 lbs of N and 35 lbs P_2O_5 may be added as a starter fertilizer at or just prior to planting in order to ensure nutrient availability to seedlings, promoting a more vigorous plant more capable of utilizing nutrients already in the soil. Any commercial fertilizer applied will be counted towards the total recommendation and subtracted from the gross recommendation in the N credit section ("other") of the rate determination sheet. If 35 lbs N are not required to grow the crop, this amount of starter will still be used.

Small grain grazing

Where small grains are fall grazed, additional nutrient needs based upon animal intake or a flat rate (30-50 lbs N/a) may be applied as outlined in the formulas for CSU and Olsen Lab.

In Season N adjustments

The formulas provided represent the maximum amount of N to be applied with advanced planning. It is not uncommon for nitrogen rates to be adjusted during the growing season. The following outlines procedures which may be used to make in season adjustments. Only one test will be used at any given time of plant growth to provide a recommendation. However, additional tests may be used at other stages of crop growth. For instance, it is possible that a soil test at side dressing could indicate the soil is likely to have enough nitrogen to grow a crop, but a tissue test at the reproductive phase of growth could show the plant is now deficient in nitrogen and needs more N.

Pre-Sidedress Nitrate Test (PSNT)

1 foot soil samples are analyzed for nitrate when corn is 6 to 12" tall. Guidance documents from Cooperative Extension, either from CSU or from a surrounding state, will be used to interpret results.

APPENDIX E

NUTRIENT MANAGEMENT PLAN TERMS

5) COLORADO PHOSPHORUS INDEX RISK ASSESSMENT

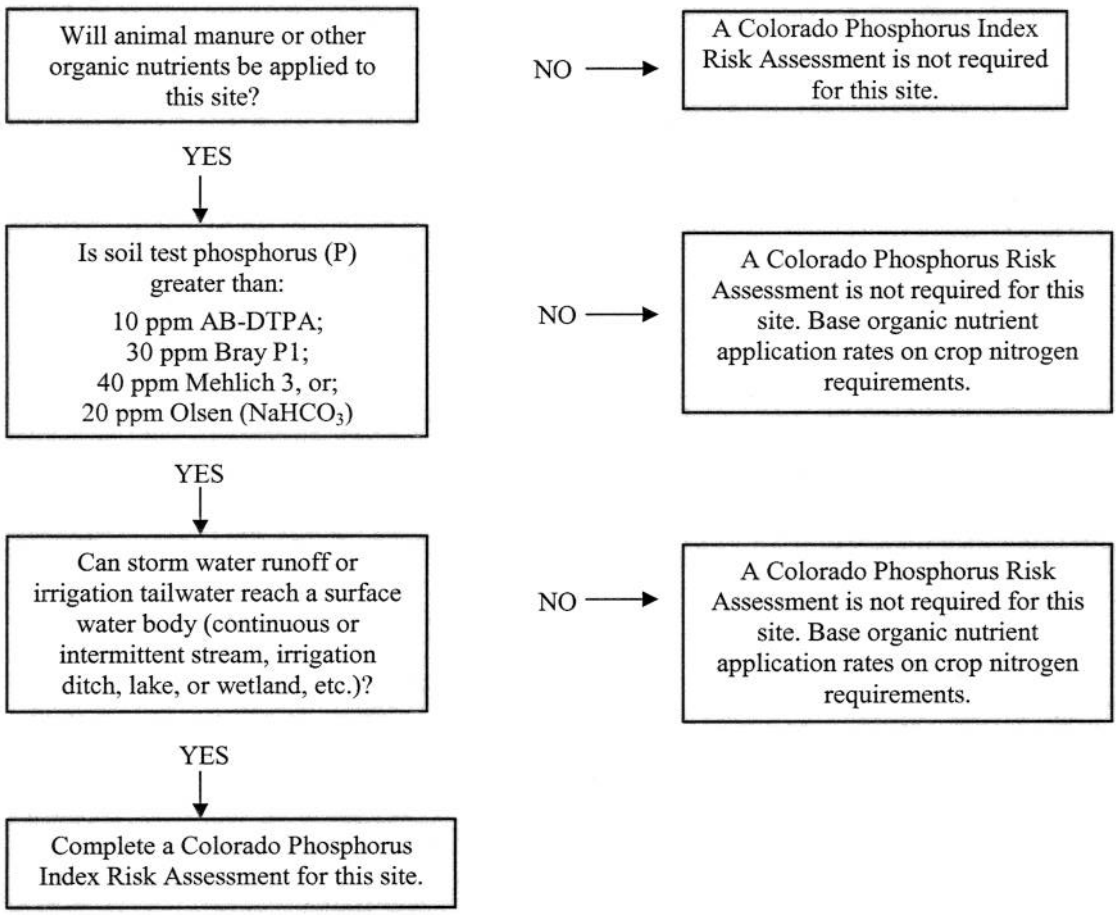
Results from the assessment are provided on the Rate Determination Sheets in Appendix F.

5) PHOSPHORUS AND NITROGEN TRANSPORT

Application rates for manure and process wastewater applied to land application sites minimize phosphorus and nitrogen transport from the application sites to surface waters. An initial assessment of the potential for phosphorus and nitrogen transport risk to surface water will be made prior to manure or process wastewater being applied to an application site. [Regulation No. 61.17(8)(b)(xii)(B)]

There is currently no published tool suitable for assessing nitrogen transport risk. Phosphorus and nitrogen transport risk will be assessed using the Colorado Phosphorus Index Risk Assessment.

The following flow chart will be used to determine if a phosphorus risk assessment must be completed for a land application site:



5) PHOSPHORUS AND NITROGEN TRANSPORT (continued)

For land application fields that require a Colorado Phosphorus Index Risk Assessment to be completed, the following applicable best management practices will be incorporated:

(A) Phosphorus-based manure and process wastewater application rates may be made to application sites where the risk of off-site phosphorus transport is scored as high.

(B) No application of manure or process wastewater will be made to land application sites where the risk of off-site phosphorus transport is rated as very high[1].

(C) No application of manure or process wastewater will be made to a land application site where the risk of off-site nitrogen transport to surface water is not minimized.

(D) Where a multi-year phosphorus application was made to a land application site, no additional manure or process wastewater will be applied to the same site in subsequent years until the applied phosphorus has been removed from the site via harvest and crop removal.

---

[1] Where the initial assessment of a land application site scores very high, the facility has a three-year period within which to manage the site for the purpose of lowering the phosphorus transport risk assessment rating to high or lower. During this period, manure or process wastewater may be applied to the site at either nitrogen- or phosphorus-based rates.

After completing an initial assessment of the potential for phosphorus and/or nitrogen transport from a land application site to surface water, additional assessments will be made every five years or at the frequency described below, whichever is sooner:

Cause for Re-Assessment	Frequency
Where a crop management change has occurred	For phosphorus - Assess within one year after such a change would reasonably result in an increase in the transport risk assessment score. For nitrogen – Assess within one year after such a change would reasonably result in the nitrogen transport to surface water not being minimized.
Where a phosphorus transport risk assessment score was very high	Assess phosphorus transport risk within six months of intending to apply manure or process wastewater, except where the initial assessment is scored as very high, then there shall be a three-year period within which to manage the site for the purpose of lowering the phosphorus transport risk assessment rating to high or less. During this period, manure or process wastewater may be applied to the site at either nitrogen- or phosphorus-based rates.
Where a nitrogen transport risk assessment reveals that nitrogen transport to surface water is not minimized	Assess nitrogen transport risk within six months of intending to apply manure or process wastewater.

ASSOCIATED RECORDS:

1) Copies of phosphorus/nitrogen transport risk assessments are maintained on-site.

APPENDIX F

NUTRIENT MANAGEMENT PLAN TERMS

5) FIELD NUTRIENT BALANCE CALCULATIONS

See Rate Determination Sheets

Wastewater Application - te Determination Sheet

Crop sequence/rotation and year					
Year	2012	2013	2014	2015	2016
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa

Field: South
Farm: Dyecrest Dairy

1. Field Information:

Crop: Alfalfa *Crop Year:* 2012 *Acres:* 11
Soil name/texture: Loam *Previous Crop:* Alfalfa

Soil test results	**Date**	**N(as NO_3-N), ppm**	**P (Olsen), ppm**	**K (NH_4OAc), ppm**	**pH**
	11/9/2011	51.3	83	1204	8.5

P-Index Score 11 ***Application rate based upon*** *nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	3.7 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		194	
Formula Used:	(((YG*2000)*(%Protein/6.25)*(0.6))/0.66) CSU Soil Publication # 0.565		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		194	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	51.3 ppm NO3	185	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	102 10% avail	10	
d) Other:			
e) Total nitrogen credit		195	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		0	0

Sample ID: *SW Pond* **Lab #:** *17885*

Application method: Sprinkler

b) Expected NH_3-N availability	55 %		
c) NH4-N available from manure	0.97 lbs/1000 gal		
d) Expected mineralization rate	30 %		
e) Organic N available from manure	0.51 lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	0.7	
Recommended manure application rate (a/f)	**Gal/acre**	**0**	
	ac-in/acre	**0.0**	

g) P2O5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P2O5/acre** 0

h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

No application this year

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE

Wastewater Application - te Determination Sheet

Crop sequence/rotation and year					
Year	2012	2013	2014	2015	2016
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa

Field: South
Farm: Dyecrest Dairy

1. Field Information:

Crop: Alfalfa *Crop Year:* 2013 *Acres:* 11
Soil name/texture: Loam through 2016 *Previous Crop:* Alfalfa

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	11/9/2011	8.3*	83	1204	8.5

*assumes soil nitrate reduced by 155 lbs from previous crop

P-Index Score 11 ***Application rate based upon*** *nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	3.7 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		194	
Formula Used:	(((YG*2000)*(%Protein/6.25)*(0.6))/0.66) CSU Soil Publication # 0.565		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		194	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	8.3 ppm NO3	30	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	0 10% avail	0	
d) Other:			
e) Total nitrogen credit		30	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		164	0

Sample ID: *SW Pond* **Lab #:** *17885*

Application method: Sprinkler

b) Expected NH_3-N availability	55 %		
c) NH4-N available from manure	0.97 lbs/1000 gal		
d) Expected mineralization rate	30 %		
e) Organic N available from manure	0.51 lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	0.7	
Recommended manure application rate (a/f)	**Gal/acre**	**238,697**	
	ac-in/acre	**8.7**	

g) P2O5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P2O5/acre** 84
h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

Irrigated via sprinkler in the spring, summer, and fall

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE

Wastewater Application - te Determination Sheet

Crop sequence/rotation and year					
Year	2012	2013	2014	2015	2016
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa

Field: West
Farm: Dyecrest Dairy

1. Field Information:

Crop: Alfalfa *Crop Year:* 2012 *Acres:* 25
Soil name/texture: Loam *Previous Crop:* Alfalfa

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	3/16/2012	85.5	72	1524	8.5

P-Index Score 11 ***Application rate based upon*** *nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P_2O_5 (lb/a)
a) Expected yield	3.7 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		194	
Formula Used:	(((YG*2000)*(%Protein/6.25)*(0.6))/0.66) CSU Soil Publication # 0.565		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		194	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	85.5 ppm NO_3	308	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	68 10% avail	7	
d) Other:			
e) Total nitrogen credit		315	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		0	0

Sample ID: *SW Pond* **Lab #:** *17885*

Application method: Sprinkler

b) Expected NH_3-N availability	55 %		
c) NH4-N available from manure	0.97 lbs/1000 gal		
d) Expected mineralization rate	30 %		
e) Organic N available from manure	0.51 lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	0.7	
Recommended manure application rate (a/f)		**Gal/acre** 0	
		ac-in/acre 0.0	

g) P_2O_5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P_2O_5/acre** 0

h) Additional P_2O_5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P_2O_5 lbs/ton x 0.6 or 0.8 = available P_2O_5)

No application this year

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE

Wastewater Application - te Determination Sheet

Crop sequence/rotation and year					
Year	2012	2013	2014	2015	2016
Crop	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa

Field: West
Farm: Dyecrest Dairy

1. Field Information:

Crop: Alfalfa *Crop Year:* 2013 *Acres:* 25
Soil name/texture: Loam through 2016 *Previous Crop:* Alfalfa

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	3/16/2012	24.4*	72	1524	8.5

*assumes soil nitrate reduced by 220 lbs from previous crop

P-Index Score 11 ***Application rate based upon*** *nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	3.7 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		194	
Formula Used:	(((YG*2000)*(%Protein/6.25)*(0.6))/0.66) CSU Soil Publication # 0.565		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		194	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	24.4 ppm NO3	88	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	0 10% avail	0	
d) Other:			
e) Total nitrogen credit		88	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		106	0

Sample ID: *SW Pond* **Lab #:** *17885*

Application method: Sprinkler

b) Expected NH_3-N availability	55 %		
c) NH4-N available from manure	0.97 lbs/1000 gal		
d) Expected mineralization rate	30 %		
e) Organic N available from manure	0.51 lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	0.7	
Recommended manure application rate (a/f)	**Gal/acre**	**154,269**	
	ac-in/acre	**5.6**	

g) P2O5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P2O5/acre** 54
h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

Irrigated via sprinkler in the spring, summer, and fall

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE

Wastewater Application - ...te Determination Sheet

Crop sequence/rotation and year					
Year	2012	2013	2014	2015	2016
Crop	Grass	Grass	Grass	Grass	Grass

Field: NW

Farm: Dyecrest Dairy

1. Field Information:

Crop: Grass/Sudan/Sudex *Crop Year:* 2012 *Acres:* 25

Soil name/texture: Clay through 2016 *Previous Crop:* Grass/Sudan/Sudex

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	11/9/2011	3.0	36	205	8

P-Index Score 10 ***Application rate based upon*** *nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P_2O_5 (lb/a)
a) Expected yield	1.3 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		77	
Formula Used:	(185-40 per ton less than 4-(3.6*ppm NO3 (1 ft))) (Table 7e CSU Bulletin #568A)		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		77	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	3 ppm NO3	11	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	0 10% avail	0	
d) Other:			
e) Total nitrogen credit		11	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		66	0

Sample ID: *SW Pond* **Lab #:** *17885*

Application method: Flood

b) Expected NH_3-N availability	78 %			
c) NH4-N available from manure	0.97 lbs/1000 gal			
d) Expected mineralization rate	30 %			
e) Organic N available from manure	0.51 lbs/1000 gal			
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal		0.9	
Recommended manure application rate (a/f)		**Gal/acre**	**72,779**	
		ac-in/acre	**2.6**	

g) P_2O_5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P_2O_5/acre** 26

h) Additional P_2O_5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P_2O_5 lbs/ton x 0.6 or 0.8 = available P_2O_5)

Flood irrigated in the spring, summer, and fall

AGPROfessionals, LLC
DEVELOPERS OF AGRICULTURE